CLAIMS

We claim:

1. A method of producing local analgesia or anesthesia in nerve tissue of a mammal experiencing pain caused by damage to or stimulation of the nerve tissue, comprising topically administering to the nerve tissue of the mammal an anesthetically or analgesically effective dose of a pharmaceutical composition comprising a compound that binds to the SS1 or SS2 subunit of a sodium channel and a pharmaceutically suitable vehicle.

2. The method of claim 1, wherein the nerve tissue region is a dental pulp region, a trigeminal nerve region, or a sciatic nerve region.

3. The method of claim 1, wherein the nerve tissue region is the dental pulp region.

4. The method of claim 1, wherein the effective dose does not cause any toxic or non-reversible side effects.

5. The method of claim 1, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is tetrodotoxin.

6. The method of claim 5, wherein the effective dose is administered at a concentration of tetrodotoxin of from 1 mM to 20 mM.

7. The method of claim 1, wherein the effective dose of tetrodotoxin produces local anesthesia or analgesia in the nerve tissue region for a period of 0.5 hour to 7 hours.

8. A method of producing local analgesia or anesthesia comprising administering an effective amount of a formulation comprising a conventional local anesthetic compound and a compound that binds to the SS1 or SS2 subunit of a sodium channel.

9. The method of claim 8, wherein the conventional local anesthetic compound is tetracaine.

10. The method of claim 8, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is tetrodotoxin.

11. The method of claim 9, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is tetrodotoxin.

12. The method of claim 8, wherein the conventional local anesthetic compound is a sodium channel blocking compound.

13. The method of claim 12, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is tetrodotoxin.

14. The method of claim 9, wherein the tetracaine is administered at a concentration of from 0.1% to 5%.

15. The method of claim 12, wherein the sodium channel blocking conventional anesthetic is administered at a concentration of from 0.1% to 5%.

16. The method according to claim 1, wherein the composition comprises at least one compound that is tetrodotoxin, anhydrotetrodotoxin, tetrodaminotoxin, methoxytetrodotoxin, ethoxytetrodotoxin, deoxytetrodotoxin or tetrodonic acid.

17. The method of claim 1, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is saxitoxin.

18. The method of claim 17, wherein the saxitoxin is administered in a concentration ranging from 1 mM to 20 mM.

19. The method of claim 17, wherein the saxitoxin is a compound comprising a tetrahydropurine moiety composed of two guanidine units fused together in a stable azaketal linkage, having a molecular formula $C_{10}H_{17}N_7O_4 \cdot 2HCl$.

20. The method of claim 17, wherein the saxitoxin is hydroxysaxitoxin or nevsaxitoxin.

21. A composition comprising a conventional local anesthetic compound and a compound that binds to the SS1 or SS2 subunit of a sodium channel.

22. The composition of claim 21, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is tetrodotoxin.

23. The composition of claim 21, wherein the comventional local anesthetic is tetracaine.

24. The composition of claim 22, wherein the conventional local anesthetic is tetracaine.

25. The composition of claim 21, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is present in an amount of from 1 to 10 mM.

26. The composition of claim 21, wherein the compound that binds to the SS1 or SS2 subunit of a sodium channel is present in an amount of from 1 to 3 mM.

27. The composition of claim 21, wherein the conventional local anesthetic is present in an amount of from 0.2 to 5 percent by weight of the composition.

28. The composition of claim 25, wherein the conventional local anesthetic is present in an amount of the Ce of the conventional local anesthetic.

29. The composition of claim 26, wherein the conventional local anesthetic is present in an amount of the Ce of the conventional local anesthetic.